	Type	L #	Hits	Search Text	DBs
1	BRS	L1	13277	microfluid$9	US-PGPUB; USPAT
2	BRS	L2	766	1 and (radial or circular or round) near8 (base or platform or substrate or housing or body)	US-PGPUB; USPAT
3	BRS	L3	442	2 and (pump or micropump)	US-PGPUB; USPAT
4	BRS	L4	500	2 and (capillary or capillary near8 tube)	US-PGPUB; USPAT
5	BRS	L5	332	3 and (capillary or capillary near8 tube)	US-PGPUB; USPAT
6	BRS	L6	403	2 and (disk or disc)	US-PGPUB; USPAT
7	BRS	L7	198	5 and 6	US-PGPUB; USPAT
8	BRS	L8	246	3 and 6	US-PGPUB; USPAT
9	BRS	L9	558	microfluid$9	EPO
10	BRS	L10	0	9 and (radial or circular or round) near8 (base or platform or substrate or housing or body)	EPO
11	BRS	L11	1	9 and (radial or circular or round or disc or disk) near8 (base or platform or substrate or housing or body)	EPO
12	BRS	L12	1090	1 and (radial or circular or round or disc or disk) near8 (base or platform or substrate or housing or body)	US-PGPUB; USPAT
13	BRS	L13	569	12 and (pump or micropump)	US-PGPUB; USPAT

	Type	L #	Hits	Search Text	DBs
14	BRS	L14	418	13 and (capillary or capillary near8 tube)	US-PGPUB; USPAT
15	BRS	L15	683	12 and (capillary or capillary near8 tube)	US-PGPUB; USPAT
16	BRS	L16	2092	microfluid$9	DERWENT
17	BRS	L17	9	16 and (radial or circular or round or disc or disk) near8 (base or platform or substrate or housing or body)	DERWENT
18	BRS	L19	0	18 and (radial or circular or round or disc or disk) near8 (base or platform or substrate or housing or body)	IBM_TDB
19	BRS	L18	3	microfluid$9	IBM_TDB
20	BRS	L20	79	microfluid$9	JPO
21	BRS	L21	0	20 and (radial or circular or round or disc or disk) near8 (base or platform or substrate or housing or body)	JPO
22	BRS	L22	0	20 and (radial or circular or round or disc or disk) with (base or platform or substrate or housing or body)	JPO

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 NEWS  7  MAY 30   IPC 8 Rolled-up Core codes added to CA/CAplus and
                   USPATFULL/USPAT2
 NEWS  8  MAY 30   The F-Term thesaurus is now available in CA/CAplus
 NEWS  9  JUN 02   The first reclassification of IPC codes now complete in
                   INPADOC
 NEWS 10  JUN 26   TULSA/TULSA2 reloaded and enhanced with new search and
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 NEWS 11  JUN 28   Price changes in full-text patent databases EPFULL and PCTFULL
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 NEWS 15  AUG 09   INSPEC enhanced with 1898-1968 archive
 NEWS 16  AUG 28   ADISCTI Reloaded and Enhanced
 NEWS 17  AUG 30   CA(SM)/CAplus(SM) Austrian patent law changes
 NEWS 18  SEP 11   CA/CAplus enhanced with more pre-1907 records
 NEWS 19  SEP 21   CA/CAplus fields enhanced with simultaneous left and right
                   truncation
 NEWS 20  SEP 25   CA(SM)/CAplus(SM) display of CA Lexicon enhanced
 NEWS 21  SEP 25   CAS REGISTRY(SM) no longer includes Concord 3D coordinates
 NEWS 22  SEP 25   CAS REGISTRY(SM) updated with amino acid codes for pyrrolysine
 NEWS 23  SEP 28   CEABA-VTB classification code fields reloaded with new
                   classification scheme

 NEWS EXPRESS  JUNE 30 CURRENT WINDOWS VERSION IS V8.01b, CURRENT
               MACINTOSH VERSION IS V6.0c(ENG) AND V6.0Jc(JP),
               AND CURRENT DISCOVER FILE IS DATED 26 JUNE 2006.

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=> s microfluid?
L1       17691 MICROFLUID?

=> s l1 and (radial? or circular or round) (s) (base or platform or substrate or
housing or body)
L2          40 L1 AND (RADIAL? OR CIRCULAR OR ROUND) (S) (BASE OR PLATFORM OR
               SUBSTRATE OR HOUSING OR BODY)

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L3   ANSWER 1 OF 35  CAPLUS  COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER:        2006:922134  CAPLUS
DOCUMENT NUMBER:         145:317317
TITLE:                   Flow switching on a multi-structured
                         microfluidic cd (compact disc) using coriolis
                         force
INVENTOR(S):             Zoval, Jim V.; Madou, Marc J.; Jia, Guangyao; Kim,
                         Jitae; Kido, Horacio
PATENT ASSIGNEE(S):      The Regents of the University of California, USA
SOURCE:                  PCT Int. Appl., 22pp.
                         CODEN: PIXXD2
DOCUMENT TYPE:           Patent
LANGUAGE:                English
FAMILY ACC. NUM. COUNT:  1
PATENT INFORMATION:

     PATENT NO.          KIND   DATE        APPLICATION NO.        DATE
     --------------      ----   --------    --------------------   --------
     WO 2006093978        A2    20060908    WO 2006-US7119         20060228
         W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH,
             CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD,
             GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR,
             KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX,
             MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE,
             SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC,
             VN, YU, ZA, ZM, ZW
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RW: AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG, BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM

PRIORITY APPLN. INFO.: US 2005-657760P P 20050302

AB A microfluidic switching device includes a planar substrate having a central axis of rotation and a radially -oriented microchannel disposed in the planar substrate that terminates at a junction. In one aspect, the junction is formed as a double-layered junction in which an upstream portion is vertically offset from a downstream portion. The upstream portion has a smaller effective cross-sectional area than the downstream portion. First and 2nd outlet chambers are coupled at one end to the junction. The device is rotated about the central axis in a clockwise direction so as to cause the fluid in the reservoir to flow into the 1st (right) outlet chamber or in a counter-clockwise direction so as to cause the fluid in the reservoir to flow into the 2nd (left) outlet chamber.

L3 ANSWER 2 OF 35 INSPEC (C) 2006 IET on STN

ACCESSION NUMBER: 2006:9064103 INSPEC

TITLE: Quantification and prediction of jet macro-mixing times in static microwell plates

AUTHOR: Lye, G.J.; Nealon, A.J.; (Dept. of Biochem. Eng., Univ. Coll. London, UK), O'Kennedy, R.D.; Titchener-Hooker, N.J.

SOURCE: Chemical Engineering Science (Aug. 2006), vol.61, no.15, p. 4860-70, 43 refs.
CODEN: CESCAC, ISSN: 0009-2509
SICI: 0009-2509(200608)61:15L.4860:QPMM;1-F
Doc.No.: S0009-2509(06)00108-4
Published by: Elsevier, UK

DOCUMENT TYPE: Journal

TREATMENT CODE: Practical; Theoretical; Experimental

COUNTRY: United Kingdom

LANGUAGE: English

AN 2006:9064103 INSPEC

AB Automated experimentation in microwell plate formats is widely used in high throughput drug discovery. Such approaches are now being considered for the study of bioprocess unit operations in order to speed the delivery of new medicines to market. The generation of useful design data from microwell formats requires an understanding of the engineering environment within individual microwells. Rapid and efficient macro-mixing is crucial in this respect to ensure the generation of quantitative and reproducible data. In this study, we have developed a high-speed video technique for the accurate quantification of jet macro-mixing times in static microwell plates which also enables visualisation of jet formation and liquid flow patterns within wells. Mixing times have been determined using both the fixed (di=0.54 mm) and disposable (di=0.6 mm) tips of a Perkin Elmer MultiProbe IITM liquid handling robot for a range of jet Reynolds numbers (Rej=1000-3960) and liquid addition volumes (VA=10-859 μl). Three microwell geometries have been investigated; one that is identical to a single well from a standard 96-round well plate (Vi=200 μl) and two novel designs based upon theories of jet mixing (Vi=200 and 1720 μl). For conditions where macro-mixing was complete within the lifespan of the jet, t95 mixing times for the standard round well were in the range 0.033-0.121s while for the larger of the two designed wells they were in the range 0.228-0.705s. The rapid mixing times in the standard round well are a consequence of increased energy dissipation as the liquid jet impinges on the base of the well. For the two designed wells maximising the jet length to nozzle diameter ratio (X/di) is shown to promote the most efficient macro-mixing due to entrainment and circulation of the bulk liquid in the well. For low volume additions

and short jet lifespans it is also shown that mixing times can be of the order of minutes. Finally, the t95 results for each of the well geometries have been correlated to the conditions used for jet formation using a correlation of the form first proposed by Baldyga and co-workers [Baldyga, J., Bourne, J.R., Dubuis, B., Etchells, A.W., Gholap, R.V., Zimmermann, B., 1995. Jet reactor scale-up for mixing controlled reactions. Chemical Engineering Research & Design 73, 497-502]. This enables good prediction of the experimentally determined mixing times and estimation of the minimum liquid addition volume (VCrit) that will ensure rapid and efficient macro-mixing. The correlation therefore enables automation users to optimise or control macro-mixing times in microwell experiments. [All rights reserved Elsevier]

L3 ANSWER 3 OF 35 COMPENDEX COPYRIGHT 2006 EEI on STN DUPLICATE 1
ACCESSION NUMBER: 2006(31):3477 COMPENDEX
TITLE: Dual independent displacement-amplified micropumps with a single actuator.
AUTHOR: Tracey, M.C. (Science and Technology Research Institute University of Hertfordshire, Hatfield, Hertfordshire AL10 9AB, United Kingdom); Johnston, I.D.; Davis, J.B.; Tan, C.K.L.
SOURCE: Journal of Micromechanics and Microengineering v 16 n 8 Aug 1 2006 2006.p 1444-1452, arn: 002
CODEN: JMMIEZ ISSN: 0960-1317 E-ISSN: 1361-6439
PUBLICATION YEAR: 2006
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical
LANGUAGE: English
AN 2006(31):3477 COMPENDEX
AB We report a dual-micropump structure operated by a single actuator element. The constituent micropumps are a form of micro throttle pump (MTP) comprising a narrow flow channel incorporating two microthrottles. We term this a 'linear MTP' (LMTP). The LMTP's narrowness, in conjunction with an elastomeric substrate, allows multiple, independent, LMTPs to be actuated by a single piezoelectric actuator thereby suiting it to parallel microfluidic architectures. Furthermore, LMTP elements can be combined into parallel or series composites yielding increased maximum pumping rates or back pressures, respectively, when compared to a single LMTP element. The LMTP's flow-channel-like, linear pump chamber minimizes the development of recirculatory flows associated with circular pump chambers which, in part, determine their frequency response and hence maximum pumping rates. We have modelled, fabricated and evaluated a dual-LMTP. We report operation in three modes: as two distinct pumps, as a series composite pump, and as a parallel composite pump. Operating at about 1.6 kHz, with both pumps under identical load conditions, each pump yielded maximum pumping rates of about 750 nul min -1 and back pressures of 18 kPa, both with close matching. Configured as a series composite, a 35 kPa back pressure was achieved, and configured as a parallel composite, a maximum pumping rate of 1.4 ml min-1 resulted. Images of 5 num polystyrene beads flowing within an LMTP confirm minimal recirculatory behaviour consistent with the LMTP's increased operating frequencies compared to circular pump chamber MTPs. $CPY 2006 IOP Publishing Ltd. 13 Refs.

L3 ANSWER 4 OF 35 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2006:351297 CAPLUS
DOCUMENT NUMBER: 144:447289
TITLE: Circular orientation of biomolecular rails using micro fluidic channels
AUTHOR(S): Watanabe, Yasumasa; Suzuki, Kenji; Takeuchi, Shoji
CORPORATE SOURCE: Inst. Ind. Sci., The University of Tokyo, Japan
SOURCE: Seisan Kenkyu (2006), 58(2), 138-141
CODEN: SEKEAI; ISSN: 0037-105X
PUBLISHER: Tokyo Daigaku Seisan Gijutsu Kenkyusho

DOCUMENT TYPE: Journal
LANGUAGE: Japanese
AB A microfluidic device with circular orientation of microtubule-kinesin system was fabricated by using polydimethylsiloxane (PDMS) and glass plates. A clockwise circular orientation of microtubules was observed by gliding assay in the PDMS channels.

L3 ANSWER 5 OF 35 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2006(22):12262 COMPENDEX
TITLE: Fabrication of long microchannels with circular cross section using astigmatically shaped femtosecond laser pulses and chemical etching.
AUTHOR: Maselli, Valeria (Istituto di Fotonica e Nanotecnologie-CNR ULTRAS-INFM-CNR Politecnico di Milano, 20133 Milan, Italy); Osellame, Roberto; Cerullo, Giulio; Ramponi, Roberta; Laporta, Paolo; Magagnin, Luca; Cavallotti, Pietro Luigi
SOURCE: Applied Physics Letters v 88 n 19 2006., arn: 191107
CODEN: APPLAB ISSN: 0003-6951
PUBLICATION YEAR: 2006
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical
LANGUAGE: English
AN 2006(22):12262 COMPENDEX
AB We report on the fabrication of microfluidic channels in fused silica using femtosecond laser irradiation followed by chemical etching. Using an astigmatically shaped beam, we achieve microchannels with circular cross section and length up to 1.5 mm. We use the same femtosecond laser, with different irradiation parameters, to fabricate high quality optical waveguides on the same substrate. The integration of microchannels and waveguides will enable a forthcoming class of biophotonic sensors. $CPY 2006 American Institute of Physics. 14 Refs.

L3 ANSWER 6 OF 35 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2005:1204677 CAPLUS
DOCUMENT NUMBER: 143:455495
TITLE: Spiral-type flow-through polymerase chain reaction (PCR) chip
INVENTOR(S): Chen, Wenyuan; Jia, Xiaoyu; Niu, Zhiqiang; Zhang, Weiping
PATENT ASSIGNEE(S): Shanghai Jiao Tong University, Peop. Rep. China
SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 11 pp.
CODEN: CNXXEV
DOCUMENT TYPE: Patent
LANGUAGE: Chinese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 1584043	A	20050223	CN 2004-10024703	20040527

PRIORITY APPLN. INFO.: CN 2004-10024703 20040527
AB The invention discloses a spiral-type flow-through PCR chip for use in fields of preventive medicine and public health. The chip includes a substrate bearing microfluidic conduits and a sealing cap which is sealed together with the substrate by bonding technique, wherein the microfluidic conduits on the substrate are spiral-type; a sample inlet and a sample outlet are disposed in the sealing cap which resp. correspond to the starting and ending points of the microfluidic conduits. A circular heaters for heating the denaturation zone and the elongation zone, and a circular temperature sensor are disposed on the other side of the substrate opposite to the sealing cap; an insulating layer and a metal conductor layer are formed on

the substrate; and a radiating zone formed by metallic film for cooling the renaturation zone is disposed in the low-right area of the chip, between the insulating layer and the substrate. The invention has the advantages of increased efficiency of amplification, and broadened application range, enhanced efficiency, reduced size, as well as improved compatibility and integratability of the chip.

L3 ANSWER 7 OF 35 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2006(17):1999 COMPENDEX
TITLE: Building a tissue engineered microfluidic bioreactor array for high-throughput assays.
AUTHOR: Wen, Yuan; Yang, Shang-Tian
MEETING TITLE: 05AIChE: 2005 AIChE Annual Meeting and Fall Showcase.
MEETING LOCATION: Cincinnati, OH, United States
MEETING DATE: 30 Oct 2005-04 Nov 2005
SOURCE: AIChE Annual Meeting, Conference Proceedings 2005.p 12678
SOURCE: 05AIChE: 2005 AIChE Annual Meeting and Fall Showcase, Conference Proceedings
PUBLICATION YEAR: 2005
MEETING NUMBER: 66925
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English
AN 2006(17):1999 COMPENDEX
AB As the progress of functional genomics, the number of drug candidates has by far outgrown the present capability of cytotoxicity studies. In addition, early discoveries of toxic side effects of drugs in test can greatly reduce the risk of a lengthy and expensive drug development process. Increasing interest in toxicity study systems in vitro has made cell-based platforms an attractive approach to uncovering the toxicity effects at cellular and subcellular levels. However, conventionally, cells cultured statically on 2D surfaces may not well exhibit authentic responses upon external stimulation. We have designed and fabricated a mcirofluidic device using multiple layers of poly(dimethylsiloxane) (PDMS) through photolithography and replica molding. Each layer was designed to specifically serve part of a network of microfluidic channels for medium flow, drug serial dilution, mixers and cell culture chambers with the same dimension as the round wells of a 384 well plate. Tissue engineering scaffolds were placed in the chambers for three dimensional cell cultures on the chip. The alignment and bonding of different PDMS layers were investigated. The fluid ports were also engineered for prolonged medium flow and for convenience of the chip to be scanned within a 384 well plate reader. Optimal designs for uniform fluid distribution in the highly parallel system were also studied. Computational fluidic dynamics was also explored for the simulation of the flow rate and mass transport properties of serial dilution channels, cell culture chambers, mixers and overall fluid distribution with FluentTM. The microfluidic bioreactor array was designed to test the effects of 6 different concentrations of a drug with controls on two different types of cells in a perfusion 3D culture without interference. The numbers of cell types and drugs for the test can be easily expanded with similar designs. In this study, embryonic stem cells stably transfected with fluorescent proteins cultured in the microfluidic bioreactor array were studied for high throughput assays of drugs. The test results based on the cellular fluorescence intensity change caused by the drugs will be presented in the paper.

L3 ANSWER 8 OF 35 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(49):5575 COMPENDEX
TITLE: Thermoplastic microfluidic platform for single-molecule detection, cell culture, and actuation.
AUTHOR: Melin, Jenas (Beijer Laboratory Department of Genetics

and Pathology Hudbeck Laboratory, Uppsala, Sweden); Johansson, Henrik; Soderberg, Ola; Nikolajeff, Fredrik; Landegren, Ulf; Nilsson, Mats; Jarvius, Jonas

SOURCE: Analytical Chemistry v 77 n 22 Nov 15 2005 2005.p 7122-7130
CODEN: ANCHAM ISSN: 0003-2700

PUBLICATION YEAR: 2005
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical
LANGUAGE: English

AN 2005(49):5575 COMPENDEX

AB We have developed a multipurpose microfluidic platform that allows for sensitive fluorescence detection on inexpensive disposable chips. The fabrication scheme involves rapid injection molding of thermoplastics, followed by silica deposition and covalent attachment of an unstructured flexible lid. This combines the virtues of elastomer technology with high-throughput compact disk injection molding. Using this technique, the time to produce 100 chips using a single master can be lowered from more than 1 week by standard PDMS technologies to only a couple hours. The optical properties of the fabricated chips were evaluated by studying individual fluorescence-labeled DNA molecules in a microchannel. Concatemeric DNA molecules were generated through rolling circle replication of circular DNA molecules, which were labeled by hybridization of fluorescence-tagged oligonucleotides. Rolling circle products (RCPs) were detected after as little as 5 min of DNA polymerization, and the RCPs in solution showed no tendency for aggregation. To illustrate the versatility of the platform, we demonstrate two additional applications: The flexible property of the lid was used to create a peristaltic pump generating a flow rate of 9 nL/s. Biocompatibility of the platform was illustrated by culturing Chinese hamster ovary cells for 7 days in the microfluidic channels. $CPY 2005 American Chemical Society. 29 Refs.

L3 ANSWER 9 OF 35 COMPENDEX COPYRIGHT 2006 EEI on STN

ACCESSION NUMBER: 2004(52):8757 COMPENDEX
TITLE: Hybridization enhancement using microfluidic planetary centrifugal mixing.
AUTHOR: Bynum, Magdalena A. (Agilent Laboratories Agilent Technologies, Palo Alto, CA 94304, United States); Gordon, Gary B.
SOURCE: Analytical Chemistry v 76 n 23 Jan 3 2005 2005.p 7039-7044
CODEN: ANCHAM ISSN: 0003-2700

PUBLICATION YEAR: 2005
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English

AN 2004(52):8757 COMPENDEX

AB DNA microarrays produce their greatest sensitivities when hybridized using concentrated samples and effective mixing; however, these goals have proved elusive to combine. If samples are diluted enough to fill larger chambers, then mixing works well using either pumping or gravity with rotation, although sensitivities will suffer. Various techniques for mixing concentrated samples in small thin chambers have been proposed; however, they often leave streaks or scars, and their reusable components require careful cleaning. Here we introduce a versatile new microfluidics platform, a two-axis centrifuge whose fluidic chambers rotate in a planetary relationship to a radial gravitational field. This paradigm readily overcomes surface and viscous forces even in chambers only 50 mum thin. Thin chambers obviate the need for sample dilution and increase sensitivities and dynamic ranges 10-fold. In comparisons against conventional mixing using the same 10 mug of starting total RNA on 22 000-probe arrays, 10 000 more usable signals rose above the noise. In other experiments, planetary mixing was able to

produce comparable results while using only one-tenth the starting sample. The benefits of planetary mixing include sample conservation, shorter hybridizations, less reliance on amplification, and the ability to quantify many gene signals otherwise obscured by noise. 19 Refs.

L3 ANSWER 10 OF 35 CAPLUS COPYRIGHT 2006 ACS on STN DUPLICATE 2
ACCESSION NUMBER: 2005:1301269 CAPLUS
DOCUMENT NUMBER: 145:226872
TITLE: A microfluidic electrochemical cell based on microsystem packaging technologies applicable for biosensor development
AUTHOR(S): Santha, Hunor; Harsanyi, Gabor; Sinkovics, Balint; Makai, Dora
CORPORATE SOURCE: Department of Electronics Technology, Budapest University of Technology and Economics, Budapest, H-1111, Hung.
SOURCE: Proceedings - Electronic Components & Technology Conference (2005), 55th(Vol. 1), 588-592
CODEN: PETCES
PUBLISHER: Institute of Electrical and Electronics Engineers
DOCUMENT TYPE: Journal
LANGUAGE: English
AB A new miniaturized electrochem. cell has been designed and constructed by utilization of different electronics technologies The 25-50 μl capacity of the cylindrical shaped electrochem. cell has been built up by cutting circles in 5-10 overlapping layers of 400 μm thick Teflon foil. This multilayer structure enables very flexible solns. for in- and outlet of different materials into the electrochem. cell. The number of the working electrodes of the biosensor substrates can vary between 1-80. The reference electrode has been made of a silver wire. The circular symmetry of the counter and reference electrodes and the pattern of the working electrode array allows bipotentiostatic measurements, thus, this flexible platform is suitable for wide range of expts. of both bipotentiostatic biocatalytic sensors and DNA sensors with electronically addressed immobilization.
REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L3 ANSWER 11 OF 35 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(38):8373 COMPENDEX
TITLE: A microfluidic electrochemical cell based on microsystem packaging technologies applicable for biosensor development.
AUTHOR: Santha, Hunor (Department of Electronics Technology Budapest University of Technology and Economics, Budapest, H - 1111, Hungary); Harsanyi, Gabor; Sinkovics, Balint; Makai, Dora
MEETING TITLE: 55th Electronic Components and Technology Conference, ECTC.
MEETING ORGANIZER: IEEE Components, Packaging and Manufacturing Technology Society; Electronic Components, Assemblies and Materials Association, ECA; Electronic Industries Alliance, EIA
MEETING LOCATION: Lake Buena Vista, FL, United States
MEETING DATE: 31 May 2005-04 Jun 2005
SOURCE: Proceedings - Electronic Components and Technology Conference v 1 2005.p 588-592, (IEEE cat n CH37635)
SOURCE: 2005 Proceedings - 55th Electronic Components and Technology Conference, ECTC
CODEN: PECCA7 ISSN: 0569-5503
PUBLICATION YEAR: 2005
MEETING NUMBER: 65596
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Experimental

LANGUAGE: English
AN 2005(38):8373 COMPENDEX
AB A new miniaturized electrochemical cell has been designed and constructed by utilization of different electronics technologies The 25-50 mul capacity of the cylindrical shaped electrochemical cell has been built up by cutting circles in 5-10 overlapping layers of 400 mum thick Teflon foil. This multilayer structure enables very flexible solutions for in- and outlet of different materials into the electrochemical cell. The number of the working electrodes of the biosensor substrates can vary between 1-80. The reference electrode has been made of a silver wire. The circular symmetry of the counter and reference electrodes and the pattern of the working electrode array allows bipotentiostatic measurements, thus, this flexible platform is suitable for wide range of experiments of both bipotentiostatic biocatalytic sensors and DNA sensors with electronically addressed immobilization $CPY 2005 IEEE. 9 Refs.

L3 ANSWER 12 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2005:8502840 INSPEC
DOCUMENT NUMBER: A2005-17-6475-019; B2005-09-2575-008
TITLE: Batch-mode mixing on centrifugal microfluidic platforms
AUTHOR: Grumann, M.; Geipel, A.; Riegger, L.; Zengerle, R.; Ducree, J. (IMTEK, Freiburg Univ., Germany)
SOURCE: Lab on a Chip (May 2005), vol.5, no.5, p. 560-5, 47 refs.
CODEN: LCAHAM, ISSN: 1473-0197
SICI: 1473-0197(200505)5:5L.560:BMMC;1-6
Published by: R. Soc. Chem, UK
DOCUMENT TYPE: Journal
TREATMENT CODE: Practical; Experimental
COUNTRY: United Kingdom
LANGUAGE: English
AN 2005:8502840 INSPEC DN A2005-17-6475-019; B2005-09-2575-008
AB We present two novel fluidic concepts to drastically accelerate the process of mixing in batch-mode (stopped-flow) on centrifugal microfluidic platforms. The core of our simple and robust setup exhibits a microstructured disk with a round mixing chamber rotating on a macroscopic drive unit. In the first approach, magnetic beads which are prefilled into the mixing chamber are periodically deflected by a set of permanent magnets equidistantly aligned at spatially fixed positions in the lab-frame. Their radial positions alternatingly deviate by a slight positive and negative offset from the mean orbit of the chamber to periodically deflect the beads inbound and outbound during rotation. Advection is induced by the relative motion of the beads with respect to the liquid which results from the magnetic and centrifugal forces, as well as inertia. In a second approach - without magnetic beads - the disk is spun upon periodic changes in the sense of rotation. This way, inertia effects induce stirring of the liquids. As a result, both strategies accelerate mixing from about 7 minutes for mere diffusion to less than five seconds. Combining both effects, an ultimate mixing time of less than one second could be achieved

L3 ANSWER 13 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2005:8409489 INSPEC
DOCUMENT NUMBER: B2005-06-2575D-026
TITLE: Design and characterization of a passive recycle micromixer
AUTHOR: Min Ku Jeon; (Dept. of Chem., Korea Adv. Inst. of Sci. & Technol., Daejeon, South Korea), Joon-Ho Kim; Noh, J.; Soo Ho Kim; Hyun Gyu Park; Seong Ihl Woo
SOURCE: Journal of Micromechanics and Microengineering (Feb. 2005), vol.15, no.2, p. 346-50, 12 refs.

CODEN: JMMIEZ, ISSN: 0960-1317
SICI: 0960-1317(200502)15:2L.346:DCPR;1-J
Price: 0960-1317/05/020346+05$30.00
Doc.No.: S0960-1317(05)83628-9
Published by: IOP Publishing, UK
DOCUMENT TYPE: Journal
TREATMENT CODE: Practical; Theoretical
COUNTRY: United Kingdom
LANGUAGE: English
AN 2005:8409489 INSPEC DN B2005-06-2575D-026
AB A new design was devised for a recycle micromixer, i.e., a passive micromixer with side channels for a recycle flow. The geometry, required to perform a recycle flow and effective mixing, was determined by a simulation based on computational fluid dynamics. A recycle flow of the mixed flow of each unit was introduced to the inlet flow, and a circular flow was generated in the body of the mixer.
For complete mixing, five units of the micromixer were connected in series. The simulations were performed at Reynolds numbers of 7, 14 and 28 and channel depths of 100, 150 and 200 μm. Mixing efficiency and direction of recycle flow were significantly affected by both Re and channel depth. When channel depth was 150 μm, mixing efficiency of the micromixer increased from 89.3 to 95.6, 98.4 and 98.6% with the increase of Re from 7 to 14, 28 and 42, respectively. The increasing channel depth also increased mixing efficiency. The micromixer was fabricated by a conventional photolithography technique using polydimethylsiloxane. Color dispersion in blue ink was compared with simulated flow patterns. The characterization of mixing in the recycle micromixer was verified by using an aqueous NaOH solution and phenolphthalein solution, composed of the same volume of ethanol and water. For both cases, fully mixed profiles were achieved along five micromixers, connected in a series at a flow rate of 0.1 ml min-1 for each flow and a short residence time of 0.11 s

L3 ANSWER 14 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2005:8487635 INSPEC
DOCUMENT NUMBER: A2005-16-8780B-040; B2005-08-7230J-060
TITLE: Common platform for bipotentiostatic biocatalytic sensors and DNA sensors with electronically addressed immobilization
AUTHOR: Santha, H.; Harsanyi, G.; Sinkovics, B.; Takacs, A. (Dept. of Electron. Technol., Budapest Univ. of Technol. & Econ., Hungary)
SOURCE: 27th International Spring Seminar on Electronics Technology (IEEE Cat. No.04EX830), vol.1, 2005, p. 136-40 vol.1 of 3 vol. 580 pp., 9 refs.
ISBN: 0 7803 8422 9
Price: 0-7803-8422-9/04/$20.00
Published by: IEEE, Piscataway, NJ, USA
Conference: 27th International Spring Seminar on Electronics Technology, Bankya, Bulgaria, 13-16 May 2004
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English
AN 2005:8487635 INSPEC DN A2005-16-8780B-040; B2005-08-7230J-060
AB A new miniaturized electrochemical cell has been designed and constructed by utilization of different electronics technologies. The 25-50 μl capacity of the cylindrical shaped electrochemical cell has been built up by cutting circles in 5-10 overlapping layers of 400 μm thick Teflon foil. This multilayer structure enables very flexible solutions for inlet and outlet of different materials into the electrochemical cell. The number of working electrodes of the biosensor substrates can vary between 1-80. The reference electrode has been made of a silver

wire. The circular symmetry of the counter and reference electrodes and the pattern of the working electrode array allows bipotentiostatic measurements, thus, this flexible platform is suitable for a wide range of experiments of both bipotentiostatic biocatalytic sensors and DNA sensors with electronically addressed immobilization

L3 ANSWER 15 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2005:8329022 INSPEC
DOCUMENT NUMBER: A2005-09-8780-005
TITLE: A novel high aspect ratio microfluidic design to provide a stable and uniform microenvironment for cell growth in a high throughput mammalian cell culture array
AUTHOR: Hung, P.J.; Lee, P.J.; Sabounchi, P.; Aghdam, N.; Lin, R.; Lee, L.P. (Dept. of Bioeng., California Univ., Berkeley, CA, USA)
SOURCE: Lab on a Chip (Jan. 2005), vol.5, no.1, p. 44-8, 19 refs.
CODEN: LCAHAM, ISSN: 1473-0197
SICI: 1473-0197(200501)5:1L.44:NHAR;1-T
Published by: R. Soc. Chem, UK
DOCUMENT TYPE: Journal
TREATMENT CODE: Practical
COUNTRY: United Kingdom
LANGUAGE: English
AN 2005:8329022 INSPEC DN A2005-09-8780-005
AB We present a high aspect ratio microfluidic device for culturing cells inside an array of microchambers with continuous perfusion of medium. The device was designed to provide a potential tool for cost-effective and automated cell culture. The single unit of the array consists of a circular microfluidic chamber 40 μm in height surrounded by multiple narrow perfusion channels 2 μm in height. The high aspect ratio (20) between the microchamber and the perfusion channels offers advantages such as localization of the cells inside the microchamber as well as creating a uniform microenvironment for cell growth. Finite element methods were used to simulate flow profile and mass transfer of the device. Human carcinoma (HeLa) cells were cultured inside the device with continuous perfusion of medium at 37 °C and was grown to confluency. The microfluidic cell culture array could potentially offer an affordable platform for a wide range of applications in high throughput cell-based screening, bioinformatics, synthetic biology, quantitative cell biology, and systems biology

L3 ANSWER 16 OF 35 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2005(5):1368 COMPENDEX
TITLE: Continuous perfusion microfluidic cell culture array for high-throughput cell-based assays.
AUTHOR: Hung, Paul J. (Berkeley Sensor and Actuator Center Department of Bioengineering University of California, Berkeley, CA 94720, United States); Lee, Philip J.; Sabounchi, Poorya; Lin, Robert; Lee, Luke P.
SOURCE: Biotechnology and Bioengineering v 89 n 1 Jan 5 2005 2005.p 1-8
CODEN: BIBIAU ISSN: 0006-3592
PUBLICATION YEAR: 2005
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical; Experimental
LANGUAGE: English
AN 2005(5):1368 COMPENDEX
AB We present for the first time a microfluidic cell culture array for long-term cellular monitoring. The 10 * 10 array could potentially assay 100 different cell-based experiments in parallel. The device was

designed to integrate the processes used in typical cell culture experiments on a single self-contained microfluidic system. Major functions include repeated cell growth/passage cycles, reagent introduction, and real-time optical analysis. The single unit of the array consists of a circular microfluidic chamber, multiple narrow perfusion channels surrounding the main chamber, and four ports for fluidic access. Human carcinoma (HeLa) cells were cultured inside the device with continuous perfusion of medium at 37deg C. The observed doubling time was 1.4 +- 0.1 days with a peak cell density of [similar to]2.5*105 cells/cm2. Cell assay was demonstrated by monitoring the fluorescence localization of calcein AM from 1 min to 10 days after reagent introduction. Confluent cell cultures were passaged within the microfluidic chambers using trypsin and successfully regrown, suggesting a stable culture environment suitable for continuous operation. The cell culture array could offer a platform for a wide range of assays with applications in drug screening, bioinformatics, and quantitative cell biology. $CPY 2004 Wiley Periodicals, Inc. 22 Refs.

L3 ANSWER 17 OF 35 CAPLUS COPYRIGHT 2006 ACS on STN DUPLICATE 3
ACCESSION NUMBER: 2004:1056511 CAPLUS
DOCUMENT NUMBER: 142:186390
TITLE: Fabrication of circular-type microchannel using photoresist reflow and isotropic etching for microfluidic devices
AUTHOR(S): Seo, Chang-Taeg; Bae, Chang-Hyun; Eun, Duk-Soo; Shin, Jang-Kyoo; Lee, Jong-Hyun
CORPORATE SOURCE: Department of Electronics, Kyungpook National University, Taegu, 702-701, S. Korea
SOURCE: Japanese Journal of Applied Physics, Part 1: Regular Papers, Short Notes & Review Papers (2004), 43(11A), 7773-7776
CODEN: JAPNDE
PUBLISHER: Japan Society of Applied Physics
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The authors fabricated circular channels using photoresist reflow and isotropic etching. A silicon substrate, using Si3N4 as a mask, was selectively etched using the hydrofluoric acid, nitric acid, acetic acid (HNA) etching system for fabricating the bottom hemisphere of the channels. Photoresist reflow was used to make the top of the channels round. Then Si3N4 was deposited on the reflowed photoresist. Since the deposited Si3N4 was approx. 6000 Å thick, it was possible to observe the inside of the channel. The authors expect to apply such circular channels to simple bio-systems and microfluidic devices in which optical detection is required.
REFERENCE COUNT: 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L3 ANSWER 18 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2004:8130580 INSPEC
DOCUMENT NUMBER: A2004-22-8280-026
TITLE: Dynamic interfacial effect of electroosmotic slip flow with a moving capillary front in hydrophobic circular microchannels
AUTHOR: Jun Yang; Fuzhi Lu; Kwok, D.Y. (Dept. of Mech. Eng., Univ. of Alberta, Edmonton, Alta., Canada)
SOURCE: Journal of Chemical Physics (15 Oct. 2004), vol.121, no.15, p. 7443-8, 53 refs.
CODEN: JCPSA6, ISSN: 0021-9606
SICI: 0021-9606(20041015)121:15L.7443:DIEE;1-F
Price: 0021-9606/2004/121(15)/7443(6)/$22.00
Doc.No.: S0021-9606(04)70839-9
Published by: AIP, USA
DOCUMENT TYPE: Journal

TREATMENT CODE: Theoretical
COUNTRY: United States
LANGUAGE: English
AN 2004:8130580 INSPEC DN A2004-22-8280-026
AB Miniaturization of chemical analysis using microfabrication is an emerging technology. The use of polymeric materials as opposed to conventional glass substrate is also a promising alternative. As most polymeric materials are hydrophobic relative to glass, we describe here the implication for the loading process of electroosmotic flow (EOF) when a three-phase (solid-liquid-vapor) contact line exists. The presence of these interfaces can result in a large Laplace pressure that resists EOF and hence hinders its flow performance. This effect depends on the phenomenological contact angle at the solid-liquid interface. In our model for EOF, we considered simultaneously the presence of an electric double layer, liquid slips via a weaker solid-liquid interaction and Laplace pressure across a liquid-vapor interface

L3 ANSWER 19 OF 35 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2004:874869 CAPLUS
DOCUMENT NUMBER: 142:34613
TITLE: Hybridization Enhancement Using Microfluidic Planetary Centrifugal Mixing
AUTHOR(S): Bynum, Magdalena A.; Gordon, Gary B.
CORPORATE SOURCE: Agilent Laboratories, Agilent Technologies, Palo Alto, CA, 94304, USA
SOURCE: Analytical Chemistry (2004), 76(23), 7039-7044 CODEN: ANCHAM; ISSN: 0003-2700
PUBLISHER: American Chemical Society
DOCUMENT TYPE: Journal
LANGUAGE: English
AB DNA microarrays produce their greatest sensitivities when hybridized using concentrated samples and effective mixing; however, these goals have proved elusive to combine. If samples are diluted enough to fill larger chambers, then mixing works well using either pumping or gravity with rotation, although sensitivities will suffer. Various techniques for mixing concentrated samples in small thin chambers have been proposed; however, they often leave streaks or scars, and their reusable components require careful cleaning. Here we introduce a versatile new microfluidics platform, a two-axis centrifuge whose fluidic chambers rotate in a planetary relationship to a radial gravitational field. This paradigm readily overcomes surface and viscous forces even in chambers only 50 μm thin. Thin chambers obviate the need for sample dilution and increase sensitivities and dynamic ranges 10-fold. In comparisons against conventional mixing using the same 10 μg of starting total RNA on 22 000-probe arrays, 10 000 more usable signals rose above the noise. In other expts., planetary mixing was able to produce comparable results while using only one-tenth the starting sample. The benefits of planetary mixing include sample conservation, shorter hybridizations, less reliance on amplification, and the ability to quantify many gene signals otherwise obscured by noise.
REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L3 ANSWER 20 OF 35 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2004(30):3478 COMPENDEX
TITLE: A novel magnetic tweezers for manipulation of a single DNA molecule.
AUTHOR: Chiou, Chi-Han (Department of Engineering Science National Cheng Kung University, Tainan 701, Taiwan); Tseng, Zhao-Fu; Lee, Gwo-Bin
MEETING TITLE: 17th IEEE International Conference on Micro Electro Mechanical Systems (MEMS): Maastricht MEMS 2004 Technical Digest.
MEETING ORGANIZER: IEEE, Robotics and Automation Society

MEETING LOCATION: Maastricht, Netherlands
MEETING DATE: 25 Jan 2004-29 Jan 2004
SOURCE: Proceedings of the IEEE International Conference on Micro Electro Mechanical Systems (MEMS) 2004.p 613-616, (IEEE cat n 04CH37517)
CODEN: PMEME5 ISSN: 1084-6999
PUBLICATION YEAR: 2004
MEETING NUMBER: 63290
DOCUMENT TYPE: Conference Article
TREATMENT CODE: Experimental
LANGUAGE: English
AN 2004(30):3478 COMPENDEX
AB We report a novel magnetic tweezers for manipulation of a single DNA molecule. The micromachined DNA manipulator can stretch and rotate a single DNA molecule using arrayed microcoils. Key platform technologies including localized DNA immobilization, microcoil fabrication and microfluidics, have been integrated to form the magnetic DNA tweezers. A single DNA molecule is specifically attached onto a magnetic bead and a gold surface and manipulated under a magnetic field generated by built-in hexagonally-aligned microcoils. A highly effective method for the construction of DNA two sticky ends is developed, which is compatible with MEMS technologies. We have successfully demonstrated the rotation of the tethered-bead DNA molecule linked to the gold pattern by circular permutation of the currents applied to the microcoils. 9 Refs.

L3 ANSWER 21 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2004:8032541 INSPEC
DOCUMENT NUMBER: A2004-17-8715-027; B2004-08-2575D-087
TITLE: A novel magnetic tweezers for manipulation of a single DNA molecule
AUTHOR: Chi-Han Chiou; Zhao-Fu Tseng; Gwo-Bin Lee (Dept. of Eng. Sci., Nat. Cheng Kung Univ., Tainan, Taiwan)
SOURCE: 17th IEEE International Conference on Micro Electro Mechanical Systems. Maastricht MEMS 2004 Technical Digest (IEEE Cat. No.04CH37517), 2004, p. 613-16 of li+868 pp., 9 refs.
ISBN: 0 7803 8265 X
Price: 0 7803 8265 X/2004/$17.00
Published by: IEEE, Piscataway, NJ, USA
Conference: 17th IEEE International Conference on Micro Electro Mechanical Systems. Maastricht MEMS 2004 Technical Digest, Maastricht, Netherlands, 25-29 Jan. 2004
Sponsor(s): IEEE; Robotics and Automation Soc
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English
AN 2004:8032541 INSPEC DN A2004-17-8715-027; B2004-08-2575D-087
AB We report a novel magnetic tweezers for manipulation of a single DNA molecule. The micromachined DNA manipulator can stretch and rotate a single DNA molecule using arrayed microcoils. Key platform technologies including localized DNA immobilization, microcoil fabrication and microfluidics, have been integrated to form the magnetic DNA tweezers. A single DNA molecule is specifically attached onto a magnetic bead and a gold surface and manipulated under a magnetic field generated by built-in hexagonally-aligned microcoils. A highly effective method for the construction of DNA two sticky ends is developed, which is compatible with MEMS technologies. We have successfully demonstrated the rotation of the tethered-bead DNA molecule linked to the gold pattern by circular permutation of the currents applied to the microcoils

L3 ANSWER 22 OF 35 COMPENDEX COPYRIGHT 2006 EEI on STN DUPLICATE 4
ACCESSION NUMBER: 2004(50):5073 COMPENDEX
TITLE: NanoLiterBioReactor: Long-term mammalian cell culture at nanofabricated scale.
AUTHOR: Prokop, Ales (NanoDelivery Inc., Nashville, TN 37211, United States); Prokop, Zdenka; Schaffer, David; Kozlov, Eugene; Wikswo, John; Cliffel, David; Baudenbacher, Franz
SOURCE: Biomedical Microdevices v 6 n 4 December 2004 2004.p 325-339
CODEN: BMICFC ISSN: 1387-2176
PUBLICATION YEAR: 2004
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental
LANGUAGE: English
AN 2004(50):5073 COMPENDEX
AB There is a need for microminiaturized cell-culture environments, i.e. NanoLiter BioReactors (NBRs), for growing and maintaining populations of up to several hundred cultured mammalian cells in volumes three orders of magnitude smaller than those contained in standard multi-well screening plates. These devices would enable the development of a new class of miniature, automated cell-based bioanalysis arrays for monitoring the immediate environment of multiple cell lines and assessing the effects of drug or toxin exposure. We fabricated NBR prototypes, each of which incorporates a culture chamber, inlet and outlet ports, and connecting microfluidic conduits. The fluidic components were molded in polydimethylsiloxane (PDMS) using soft-lithography techniques, and sealed via plasma activation against a glass slide, which served as the primary culture substrate in the NBR. The input and outlet ports were punched into the PDMS block, and enabled the supply and withdrawal of culture medium into/from the culture chamber (10-100 nL volume), as well as cell seeding. Because of the intrinsically high oxygen permeability of the PDMS material, no additional CO2/air supply was necessary. The developmental process for the NBR typically employed several iterations of the following steps: Conceptual design, mask generation, photolithography, soft lithography, and proof-of-concept culture assay. We have arrived at several intermediate designs. One is termed "circular NBR with a central post (CP-NBR)," another, "perfusion (grid) NBR (PG-NBR)," and a third version, "multitrap (cage) NBR (MT-NBR)," the last two providing total cell retention. Three cells lines were tested in detail: a fibroblast cell line, CHO cells, and hepatocytes. Prior to the culturing trials, extensive biocompatibility tests were performed on all materials to be employed in the NBR design. To delineate the effect of cell seeding density on cell viability and survival, we conducted separate plating experiments using standard culture protocols in well-plate dishes. In both experiments, PicoGreen assays were used to evaluate the extent of cell growth achieved in 1-5 days following the seeding. Low seeding densities resulted in the absence of cell proliferation for some cell lines because of the deficiency of cell-cell and extracellular matrix (ECM)-cell contacts. High viabilities were achieved in all designs. We conclude that an instrumented microfluidics-based NanoBioReactor (NBR) will represent a dramatic departure from the standard culture environment. The employment of NBRs for mammalian cell culture opens a new paradigm of cell biology, so far largely neglected in the literature. $CPY 2004 Kluwer Academic Publishers. 58 Refs.

L3 ANSWER 23 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2004:7904349 INSPEC
DOCUMENT NUMBER: A2004-09-8245-010
TITLE: Design and experiment research of integrated capillary electrophoresis chip
AUTHOR: Tian Li; Liu Xiao-Wei; Wang Xi-Lian; (MEMS Center, Harbin Inst. of Technol., China), Tian Lei; Ao Ming-Sheng; Xiong Jun

SOURCE: Micronanoelectronic Technology (2003), vol.40, no.7-8, p. 340-3, 4 refs.ISSN: 1671-4776
SICI: 1671-4776(2003)40:7/8L.340:DERI;1-A
Published by: Editorial Board of Micronanoelectronic Technol, China
DOCUMENT TYPE: Journal
TREATMENT CODE: Practical; Experimental
COUNTRY: China
LANGUAGE: Chinese
AN 2004:7904349 INSPEC DN A2004-09-8245-010
AB The fluid distribution in the micro-channel of ICEC (integrated capillary electrophoresis chip) was simulated using ANSYS software. The relations between the micro-channel structure and flow velocity under different sample injection modes were obtained. Then the optimized channel structure was chosen by the width of 16 μm, the depth of the chip was determined 10 μm and the effective separation length of 3.5 cm with round corner channel. The chip structure was designed. Using the principle of laser-induced-fluorescence, the detection system for this chip was set up. The experiment for the ICEC could realize the base line separation of two DNA restriction fragments ranging from 500 bp to 1021 bp with excellent resolution. The result of the experiment would be the stable groundwork for further research in ICEC

L3 ANSWER 24 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2004:7947668 INSPEC
DOCUMENT NUMBER: B2004-06-2575F-013
TITLE: Fabrication of cylinder type micro channel using photoresist reflow and isotropic etching
AUTHOR: Chang-Hyun Bae; Chang-Taeg Seo; Jong-Hyun Lee (Sch. of Electron. & Electr. Eng., Kyungpook Nat. Univ., Taegu, South Korea)
SOURCE: Digest of Papers Microprocesses and Nanotechnology 2003. 2003 International Microprocesses and Nanotechnology Conference, 2003, p. 200-1 of xxv+349 pp., 4 refs.
ISBN: 4 89114 040 2
Published by: Japan Soc. of Appl. Phys, Tokyo, Japan
Conference: Digest of Papers Microprocesses and Nanotechnology 2003. 2003 International Microprocesses and Nanotechnology Conference, Tokyo, Japan, 29-31 Oct. 2003
Sponsor(s): Japan Soc. of Appl. Phys
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental
COUNTRY: Japan
LANGUAGE: English
AN 2004:7947668 INSPEC DN B2004-06-2575F-013
AB In this paper we have fabricated cylinder type micro channel using photoresist reflow and isotropic etching. Si substrate, using a Si3N4 (6000A) as a mask, was selectively etched using a HNA etching system for the bottom hemisphere of the channel. Photoresist reflow was used to make the top of the channel round. Then Si3N4 was deposited on the reflowed photoresist. Since the deposited Si3N4 was about 6000 A thick it is possible to see the inside of the channel. This channel is expected to be applied to simple bio and microfluidic devices in which optical detection is needed

L3 ANSWER 25 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2004:7937855 INSPEC
DOCUMENT NUMBER: A2004-11-6180B-007; B2004-05-2575-050
TITLE: Laser micromachining for microfluidic, microelectronic and MEMS applications
AUTHOR: Fedosejevs, R.; Argument, M.; Sardarli, A.; Kirkwood, S.E.; Holenstein, R.; Tsui, Y.Y. (Dept. of Electr. &

Comput. Eng., Univ. of Alberta, Edmonton, Alta, Canada)
SOURCE: Proceedings International Conference on MEMS, NANO and Smart Systems, 2003, p. 53 of xii+437 pp.
Editor(s): Badawy, W.; Moussa, W.
ISBN: 0 7695 1947 4
Price: 0 7695 1947 4/2003/$17.00
Published by: IEEE Comput. Soc, Los Alamitos, CA, USA
Conference: Proceedings International Conference on MEMS, NANO and Smart Systems, Banff, Alta., Canada, 20-23 July 2003
Sponsor(s): iCore, Canda; MANCEF, USA; Micronet R&D, Canada; Nat. Inst. Nano Technol., Canada; Univ. Alberto, Canada; Univ. Calgary, Canada
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Application; Practical; Theoretical
COUNTRY: United States
LANGUAGE: English
AN 2004:7937855 INSPEC DN A2004-11-6180B-007; B2004-05-2575-050
AB 'Summary form only given'. Laser micromachining of dielectrics and metals is a versatile fabrication and repair tool for applications in micro-fluidics, microelectronics and MEMS. Issues such as ablation threshold, ablation rate, incubation of damage at subthreshold fluences, edge resolution, debris creation and residual substrate damage are all important in determining the suitability of this technique for these applications. An extensive study is being carried out on drilling of holes in glasses of interest to microfluidic systems using both nanosecond UV laser pulses at 266 nm and femtosecond pulses at 800 nm. The drill rate and maximum ablation depth has been measured for various holes sizes ranging from 25 to 100 μm in diameter. The resultant morphology is measured using an optical microscope and a scanning electron microscope showing that redeposition and loss of beam fluence down the hole limits the maximum hole depth for a given entrance laser fluence. The results indicate that, in some cases at deep depths near the end point of the hole, the shape may no longer be round . Cracking around the entrance of the hole is also observed with nanosecond drilling and a new technique involving heating of the substrate during the laser interaction is being studied to try to reduce the degree of cracking. Redeposition of glass around the entrance of the drilled hole, which complicates applications where contact must be made to an adjoining surface, is another issue. In order to minimize redeposition, techniques of using a protective sacrificial layer are being investigated. In particular, the use of a protective tungsten thin film which can be stripped off, taking the overcoated debris with the film, is being investigated. In order to understand the microscopic processes occurring within the material and to predict the expected ablation thresholds, ablation rates and residual damage to the material structure, a molecular dynamics simulation code is under development to model the ablation of silicon and the ablation of glasses. Current experimental results and theoretical understanding will be presented in this paper

L3 ANSWER 26 OF 35 CAPLUS COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER: 2002:906820 CAPLUS
DOCUMENT NUMBER: 137:392245
TITLE: Method for producing microchannels having circular cross-sections in glass for microfluidics
INVENTOR(S): Krulevitch, Peter; Hamilton, Julie K.; Ackler, Harold D.
PATENT ASSIGNEE(S): The Regents of the University of California, USA
SOURCE: U.S. Pat. Appl. Publ., 5 pp.
CODEN: USXXCO
DOCUMENT TYPE: Patent
LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 2002174686	A1	20021128	US 2001-851231	20010507
PRIORITY APPLN. INFO.:			US 2001-851231	20010507

AB A process for micromachining capillaries was having circular cross sections in glass substrates. Microchannels are isotropically etched into a flat glass substrate, resulting in a semi-circular half-channel (or a rectangle with rounded corners). A 2nd flat glass substrate is then fusion bonded to the 1st substrate, producing sealed microchannels with rounded bottom corners and a flat top surface having sharp corners. The process is completed by annealing at a sufficiently high temperature (.apprx.750°) to allow surface tension forces and diffusional effects to lower the over-all energy of the microchannels by transforming the cross-section to a circular shape. The process can be used to form microchannels with circular cross sections by etching channels into a glass substrate, then anodically bonding to a Si wafer and annealing. The process will work with other materials such as polymers.

L3 ANSWER 27 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2002:7364985 INSPEC
DOCUMENT NUMBER: B2002-10-2575F-027
TITLE: Process characterization of fabricating 3D micro channel systems by laser-micromachining
AUTHOR: Qin, S.J.; Li, W.J. (Dept. of ACAE, Chinese Univ. of Hong Kong, Shatin, China)
SOURCE: Sensors and Actuators A (Physical) (1 April 2002), vol.A97-98, p. 749-57, 9 refs.
CODEN: SAAPEB, ISSN: 0924-4247
SICI: 0924-4247(20020401)A9798L.749:PCFM;1-6
Price: 0924-4247/02/$22.00
Doc.No.: S0924-4247(02)00016-X
Published by: Elsevier, Switzerland
Conference: Proceedings of 11th International Conference on Solid State Sensors and Actuators Transducers '01/Eurosensors XV, Munich, Germany, 10-14 June 2001
DOCUMENT TYPE: Conference; Conference Article; Journal
TREATMENT CODE: Experimental
COUNTRY: Switzerland
LANGUAGE: English
AN 2002:7364985 INSPEC DN B2002-10-2575F-027
AB A novel process technology was developed to create 3D micro channel systems bounded by solid 3D quartz substrates without damaging the bounding surfaces of the substrate. The process uses a Nd:YAG laser to induce thermal energy or plasma to micromachine channels in substrates which are transparent to the spectrum from UV to near IFR wavelength. We have demonstrated that this process is capable of fabricating up to 4 mm long circular cross-section channels with diameters ranging from 25 to 200 μm. The channel diameter can be controlled by a software program that interfaces with the laser system, thus allowing complete channel systems to be designed on a CAD software and then directly fabricated by the laser system. The process technology, process characterization, and initial test results of the fabricated micro channels are presented in this paper

L3 ANSWER 28 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2002:7348134 INSPEC
DOCUMENT NUMBER: B2002-09-2575F-072
TITLE: Fabrication of complex micro channel systems inside optically-transparent 3D substrates by laser

processing
AUTHOR: Shui-jie Qin; Li, W.J.; (Center for Micro & Nano Syst., City Univ. of Hong Kong, China), Tao Mei
SOURCE: TRANSDUCERS '01. EUROSENSORS XV. 11th International Conference on Solid-State Sensors and Actuators. Digest of Technical Papers, vol.2, 2001, p. 1624-7 vol.2 of 2 vol. 1807 pp., 8 refs.
Editor(s): Obermeier, E.
ISBN: 3 540 42150 5
Published by: Springer-Verlag, Berlin, Germany
Conference: Proceedings of 11th International Conference on Solid State Sensors and Actuators Transducers '01/Eurosensors XV, Munich, Germany, 10-14 June 2001
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental
COUNTRY: Germany
LANGUAGE: English
AN 2002:7348134 INSPEC DN B2002-09-2575F-072
AB A novel process technology was developed to create 3D micro channel systems bounded by solid 3D quartz substrates without damaging the bounding surfaces of the substrate. The process uses a Nd:YAG laser to induce thermal energy or plasma to micromachine channels in substrates which are transparent to Nd:YAG laser wavelength. We have demonstrated that this process is capable of fabricating up 4 mm long circular cross-section channels with diameters ranging from 25 to 200 microns. The channel diameter can be controlled by a software program that interfaces with the laser system, thus allowing complete channel systems to be designed on a CAD software and then directly fabricated by a laser system. The process technology, process characterization, and initial test results of the fabricated micro channels are presented in this paper

L3 ANSWER 29 OF 35 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2000(27):7060 COMPENDEX
TITLE: Normally closed in-channel micro check valve.
AUTHOR: Wang, Xuan-Qi (California Inst of Technology, Pasadena, CA, USA); Tai, Yu-Chong
MEETING TITLE: 13th Annual International Conference on Micro Electro Mechanical Systems (MEMS 2000).
MEETING ORGANIZER: IEEE Robotics and Automation Society
MEETING LOCATION: Miyazaki, Jpn
MEETING DATE: 23 Jan 1900-27 Jan 1900
SOURCE: Proceedings of the IEEE Micro Electro Mechanical Systems (MEMS) 2000.p 68-73
CODEN: PMEME5
PUBLICATION YEAR: 2000
MEETING NUMBER: 56837
DOCUMENT TYPE: Journal
TREATMENT CODE: Theoretical
LANGUAGE: English
AN 2000(27):7060 COMPENDEX
AB We present here the first surface-micromachined, normally closed, in-channel, Parylene check valve.This device is fabricated monolithically on a silicon substrate using a five-layer Parylene process.The operating structure of the check valve is a circular sealing plate on top of a ring-shaped valve seat.The sealing plate is center-anchored on top of a chamber diaphragm that is vacuum-collapsed to the bottom of the chamber in order to achieve a normally closed position.A thin gold layer on the roughened valve seat surface is used to reduce stiction between the sealing plate and the valve seat.We have achieved an in-channel check valve with a cracking (opening) pressure of 20 to approximately 40 kPa under forward bias and no measurable leakage under reverse bias up to 270 kPa.Using this design, this valve performs well in

two-phase microfluidic systems (i.e.microchannel flows containing gas, liquid, or gas/liquid mixture).(Author abstract) 6 Refs.

L3 ANSWER 30 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2000:6636002 INSPEC
DOCUMENT NUMBER: B2000-08-8380M-014; C2000-08-3260P-013
TITLE: A normally closed in-channel micro check valve
AUTHOR: Xuan-Qi Wang; Yu-Chong Tai (Dept. of Electr. Eng., California Inst. of Technol., Pasadena, CA, USA)
SOURCE: Proceedings IEEE Thirteenth Annual International Conference on Micro Electro Mechanical Systems (Cat. No.00CH36308), 2000, p. 68-73 of xiv+810 pp., 6 refs.
ISBN: 0 7803 5273 4
Price: 0 7803 5273 4/2000/$10.00
Published by: IEEE, Piscataway, NJ, USA
Conference: Proceedings IEEE Thirteenth Annual International Conference on Micro Electro Mechanical Systems, Miyazaki, Japan, 23-27 Jan. 2000
Sponsor(s): IEEE Robotics & Autom. Soc.; Micromachine Center
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English
AN 2000:6636002 INSPEC DN B2000-08-8380M-014; C2000-08-3260P-013
AB We present here the first surface-micromachined, normally closed, in-channel, Parylene check valve. This device is fabricated monolithically on a silicon substrate using a five-layer Parylene process. The operating structure of the check valve is a circular sealing plate on top of a ring-shaped valve seat. The sealing plate is center-anchored on top of a chamber diaphragm that is vacuum-collapsed to the bottom of the chamber in order to achieve a normally closed position. A thin gold layer on the roughened valve seat surface is used to reduce stiction between the sealing plate and the valve seat. We have achieved an in-channel check valve with a cracking (opening) pressure of 20 40 kPa under forward bias and no measurable leakage under reverse bias up to 270 kPa. Using this design, this valve performs well in two-phase microfluidic systems (i.e. microchannel flows containing gas, liquid, or gas/liquid mixture)

L3 ANSWER 31 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2001:6894274 INSPEC
DOCUMENT NUMBER: B2001-05-2575F-026
TITLE: Deep X-ray exposure system with multistage for 3D microfabrication
AUTHOR: You, H.; Matsuzuka, N.; Yamaji, T.; Tabata, O. (Fac. of Sci. & Eng., Ritsumeikan Univ., Shiga, Japan)
SOURCE: MHS2000. Proceedings of 2000 International Symposium on Micromechatronics and Human Science (Cat. No.00TH8530), 2000, p. 53-8 of vii+247 pp., 7 refs.
ISBN: 0 7803 6498 8
Price: 0 7803 6498 8/2000/$10.00
Published by: IEEE, Piscataway, NJ, USA
Conference: MHS2000. Proceedings of 2000 International Symposium on Micromechatronics and Human Science, Nagoya, Japan, 22-25 Oct. 2000
Sponsor(s): IEEE Ind. Electron. Soc.; IEEE Robotics & Autom. Soc.; City of Nagoya; Nagoya Urban Ind. Promotion Corp.; Chubu Ind. Adv. Center; Nagoya Univ.; Chubu Sci. & Technol. Center; Japan Soc. Mech. Eng.; Robotics Soc. Japan; Soc. Instrum. & Control Eng.; Res. Committee on Micromechatronics; Tech. Committee on Micro-mechanisms of Japan Soc. of Japan Soc. Precision Eng.; Chubu Bureau of Int. Trade & Ind.

MITI; Federation of Micromachine Technol.; Micromachine Center; Aichi Prefecture; Gifu Prefecture; Shizuoka Prefecture; Nagano Prefecture; Nagoya Chamber of Commerce & Ind.; Chubu Econ. Federation; Nagoya Junior Chamber
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English
AN 2001:6894274 INSPEC DN B2001-05-2575F-026
AB This paper reports a new deep X-ray exposure system to realize 3D microstructures with controllable curved and inclined walls. Based on a compact synchrotron light source, a dedicated X-ray beamline and the exposure device have been constructed. They could work in exposure environments of vacuum or helium gas. The exposure device was mainly made up of 5 stages and had as many as 6 degrees of freedom, which enabled the system to have more functions than the normal one. Besides the scan in its plane, the substrate surface could also rotate round one of its normal and tangent respectively. Driven by a PZT stage, the X-ray mask could move freely in its plan against the substrate behind, which were used to control the wall inclination and flexure of the substrate structure. The system also had off-line mask-substrate alignment function. Various 3D PMMA microstructures can be realized by the system, such as lens array, nozzles, tube connector, conical tubes, inclined channels, long circle channels, angle pipe with smooth joint, cone, gear rack, long column with curve cross-section etc., which are impossible with the normal X-ray lithography system. A series of deep X-ray lithography experiments have been completed and obtained some interesting 3D PMMA microstructures and the relationship between the etching depth and the dose energy of the exposure. It demonstrated the potential of the system, which will greatly enlarge the application fields of deep X-ray lithography and LIGA process

L3 ANSWER 32 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2000:6515952 INSPEC
DOCUMENT NUMBER: A2000-07-0710C-018; B2000-04-2575F-039
TITLE: Mass separation using thin PTFE membranes
AUTHOR: Rummler, Z.; Bacher, W.; Saile, V.; Schomburg, W.K. (Forschungszentrum, Inst. fur Mikrostrukturtech., Karlsruhe, Germany)
SOURCE: Proceedings of the SPIE - The International Society for Optical Engineering (1999), vol.3680, pt.1-2, p. 1014-21, 15 refs.
CODEN: PSISDG, ISSN: 0277-786X
SICI: 0277-786X(1999)3680:1/2L.1014:MSUT;1-#
Price: 0277-786X/99/$10.00
Published by: SPIE-Int. Soc. Opt. Eng, USA
Conference: Design, Test, and Microfabrication of MEMS and MOEMS, Paris, France, 30 March-1 April 1999
Sponsor(s): SPIE; CNRS-INPC-UJF; IEEE
DOCUMENT TYPE: Conference; Conference Article; Journal
TREATMENT CODE: Practical; Experimental
COUNTRY: United States
LANGUAGE: English
AN 2000:6515952 INSPEC DN A2000-07-0710C-018; B2000-04-2575F-039
AB Devices for mass separation have been engineered and were fabricated using the AMANDA process. The key component is a 5 μm thin, semi-permeable PTFE (polytetrafluorethylene) membrane with a circular diameter of 42 mm. The membrane is encapsulated in a PTFE and PEEK (polyetheretherketone) housing. In experiments, this novel device separated a gas flow of approximately 1 μl/min from a methanol feed stream of 1 ml/min at a pressure difference of 900 hPa. The separation process was simulated in FE-calculations exploiting analogies between diffusion theory and heat transfer. Mechanical

stability and creeping of the PTFE membrane were investigated as well. All parts in contact with the fluids to be separated are made of chemically inert polymers. As a consequence, a welding process had to be developed for bonding the PTFE membrane to the PTFE housing. This was accomplished with an intermediate FEP (polytetrafluorethylene/hexafluorpropylene) layer. Extension of this bonding technique to other AMANDA products will facilitate fabrication of chemically inert micropumps, -valves, and -sensors

L3 ANSWER 33 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 2000:6588707 INSPEC
DOCUMENT NUMBER: B2000-06-8380M-007; C2000-06-3260P-006
TITLE: Microvalve analysis: wall shear and diffuser effects
AUTHOR: Carmona, M.; Marco, S.; Samitier, J.; (CSIC, Barcelona Univ., Spain), Acero, M.C.; Plaza, J.A.; Esteve, J.
SOURCE: 1999 International Conference on Modeling and Simulation of Microsystems, 1999, p. 554-7 of xviii+690 pp., 11 refs.
ISBN: 0 9666135 4 6
Published by: Computational Publications, Cambridge, MA, USA
Conference: Proceedings of International Conference on Modelling and Simulation of Microsystems, Semiconductors, Sensors and Actuators, San Juan, Puerto Rico, 19-21 April 1999
Sponsor(s): Integrated Syst. Eng.; IntelliSense Corp.; MEMSCAP S.A.; Mentor Graphics Corp.; Microcosm Technol. Inc.; Molecular Simulations Inc
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Practical; Theoretical
COUNTRY: United States
LANGUAGE: English
AN 2000:6588707 INSPEC DN B2000-06-8380M-007; C2000-06-3260P-006
AB This work deals with the analysis of silicon passive microvalves. The analysed microvalves consist of a circular central mass suspended by two flexible beams anchored on a pyrex substrate. The mechanical and fluidic analysis are first done by FEM (FLOTRAN) simulations, and afterwards the results are compared to an iterative analytical model, showing good agreement at low flow rates. In this model, we have taken into account viscous losses as well as inertial ones, usually neglected in model extraction and validation. A good fitting is achieved at high flow rates for a diminished inertial losses contribution. Measurements with air have been carried out in order to validate the proposed model

L3 ANSWER 34 OF 35 COMPENDEX COPYRIGHT 2006 EEI on STN
ACCESSION NUMBER: 2000(16):3537 COMPENDEX
TITLE: Micromachined flow handling components - micropumps.
AUTHOR: Soerensen, Olaf (Inst fuer Microtechnik Mainz GmbH, Mainz, Ger); Drese, Klaus S.; Ehrfeld, Wolfgang; Hartmann, Hans-Joachim
MEETING TITLE: Proceedings of the 1999 Chemical Microsensors and Applications II.
MEETING ORGANIZER: SPIE
MEETING LOCATION: Boston, MA, USA
MEETING DATE: 19 Sep 1999-20 Sep 1999
SOURCE: Proceedings of SPIE - The International Society for Optical Engineering v 3857 1999.p 52-60
CODEN: PSISDG ISSN: 0277-786X
PUBLICATION YEAR: 1999
MEETING NUMBER: 56253
DOCUMENT TYPE: Journal
TREATMENT CODE: Experimental

LANGUAGE: English
AN 2000(16):3537 COMPENDEX
AB Microfluidic components, especially micropumps, are essential for miniaturized dosing systems, Micro Total Analysis Systems (mu -TAS) and miniaturized labs for medical diagnosis.A variety of micropumps for these different applications have been developed at the Institut fuer Mikrotechnik Mainz GmbH (IMM).Self-filling membrane pumps have been realized in various polymer materials. They consist of two injection-molded parts and a valve membrane with a thickness of only 2 mu m.After structuring the membrane with an excimer laser, a Nd:YAG laser is used to weld the parts. The micropump is driven by a piezoelectric actuator which renders frequencies up to 100 Hz.The maximum flow is 400 mu l/min water at up to 2.0*105 Pa.The total size of the micropump is 12*12*3 mm3.These measures allow it to be integrated e.g.into dosing-systems for active substances in medical applications.For fluids with high viscosity like lubricants for high performance bearings micro gear pumps are very well suited since their maximum flow rate and backpressure is higher than that of membrane pumps. Consequently, various types of gear pumps - internal and external geared systems - have been developed at IMM.The gearwheels have been manufactured by LIGA technology and are of circular or oval shape with typical dimensions of 500 to 1,000 mu m.A micro motor with an outer diameter of only 1.9 mm drives one of the gearwheels. Due to its small size the motor can be integrated into the housing of the pump, leading to micropumps, whose overall size is comparable to the size of a sugar cube.(Author abstract) 16 Refs.

L3 ANSWER 35 OF 35 INSPEC (C) 2006 IET on STN
ACCESSION NUMBER: 1999:6375724 INSPEC
DOCUMENT NUMBER: B1999-11-8380M-019; C1999-11-3260P-019
TITLE: A PZT-driven micropump
AUTHOR: Xiaohao Zang; Zhaoying Zhou; Xiongying Ye; Yong Li; Wendong Zhang (Dept. of Precision Instrum. & Mech., Tsinghua Univ., Beijing, China)
SOURCE: MHA'98. Proceedings of the 1998 International Symposium on Micromechatronics and Human Science. - Creation of New Industry - (Cat. No.98TH8388), 1998, p. 269-72 of vii+277 pp., 9 refs.
ISBN: 0 7803 5130 4
Price: 0 7803 5130 4/98/$10.00
Published by: IEEE, Piscataway, NJ, USA
Conference: MHS'98. Proceedings of the 1998 International Symposium on Micromechatronics and Human Science, Nagoya, Japan, 25-28 Nov. 1998
Sponsor(s): IEEE Ind. Electron. Soc.; IEEE Robotics & Autom. Soc.; City of Nagoya; Nagoya Urban Ind. Promotion Corp.; Chubu Ind. Adv. Center; Nagoya Univ.; Chuba Sci. & Technol. Center; Japan Soc. Mech. Eng.; Robotics Soc. Japan; Soc. Instrum. & Control Eng.; Res. Committee on Micromechatronics; Tech. Committee on Micro-mechanisms of Japan Soc. Precision Eng.; Chubu Bureau of Int. Trade & Ind. MITI; Federation of Micromachine Technol.; Micromachine Center; Aichi Prefecture; Gifu Prefecture; Mie Prefecture; Shizuoka Prefecture; Nagano Prefecture; Nagoya Chamber of Commerce & Ind.; Chubu Econ. Federation; Nagoya Junior Chamber
DOCUMENT TYPE: Conference; Conference Article
TREATMENT CODE: Application; Practical; Experimental
COUNTRY: United States
LANGUAGE: English
AN 1999:6375724 INSPEC DN B1999-11-8380M-019; C1999-11-3260P-019
AB The design, fabrication and characterization of a PZT-driven micropump is presented in this paper. It consists of a chamber, a membrane, two microvalves and a driving mechanism. The thickness of the micropump

membrane is 11 μm. The micropump chamber is round with diameter of 5 mm and depth of 0.4 mm. The microvalves made of single crystallite silicon are used on this micropump as flow direction control elements. The dimension of the valve cover is 1.5 mm+1.0 mm+7.4 μm and dimension of the valve opening is 200 μm+200 μm. Its capability of flow is more than 10 ml/min at a pressure level of about 10 kPa. The open pressure in the obverse direction is less than 200 Pa while the leakage of reverse direction is almost zero. The features of the microvalve fit the requirement of the micropump well. When the micropump chamber chip and two valve chips are assembled together as a micropump, this micropump is mounted on a metal base and then the PZT bimorph cantilever is mounted above the micropump membrane. The maximum flow rate of the micropump is 365 μl/min under 100 V, 20 Hz square wave power supply and zero pressure fall. The back pressure is 2.38 kPa and the flow control precision is better than 1 μl